

\$1.50 each

J. B. Meek

MEMOIRS  
OF THE  
GEOLOGICAL SURVEY  
OF  
THE UNITED KINGDOM.

~~~~~  
*Figures and Descriptions*

ILLUSTRATIVE OF  
BRITISH ORGANIC REMAINS.

—  
DECADE IV.  
~~~~~

PUBLISHED BY ORDER OF THE LORDS COMMISSIONERS OF HER MAJESTY'S TREASURY.

LONDON:  
PRINTED FOR HER MAJESTY'S STATIONERY OFFICE:  
PUBLISHED BY  
LONGMAN, BROWN, GREEN, AND LONGMANS.  
1852.

## BRITISH FOSSILS.

---

### DECADE THE FOURTH.

ALL the plates and descriptions in this Decade are devoted to fossil Echinodermata of the order *Echinoidea*.

The genera selected for illustration are *Temnechinus*, *Acrosalenia*, *Hyboclypus*, *Hemipneustes*, *Ananchytes* with its section *Holaster*, and *Cardiaster*. The geological age of the first is Upper Tertiary, of the second and third Oolitic, of the remainder Cretaceous. Several of the species are represented for the first time.

*Temnechinus* is a genus remarkable for its species being at present known only as fossils of the Coralline and Red Crag; it is now characterized for the first time.

The examples of *Acrosalenia* selected are both remarkable for their beauty and their very perfect condition. They are also of much interest, one on account of the rectification of its true generic position, which I have been enabled to make through the aid afforded by very perfect specimens: the other, because of the complete preservation exhibited by the specimens described of parts too often lost in fossil Echinoderms. I have appended to the descriptions of these *Acrosalenia* brief characters of some new species of this interesting oolitic genus.

*Hyboclypus* is illustrated by the finest and largest species of the genus, one discovered during the researches of the Geological Surveyors.

*Hemipneustes*, to which genus I unite *Toxaster*, is now for the first time authentically represented by a British example, remarkable for its novelty and for the light it throws upon the mutual affinities of those genera of *Echinoidea* which have excentric mouths.

The well known genus *Ananchytes* is combined (as indeed it was formerly by Lamarek) with *Holaster*. In selecting the common *Ananchytes ovata* of the Chalk for the subject of a plate and description, I have been influenced by the necessity of clearing up the confused synonymy of this fine fossil, and of settling the numerous spurious species which have been constituted out of its varieties, or from imperfect figures contained in old works.

*Cardiaster* is a new genus, lately constituted by myself for some remarkable and interesting sea-urchins, intermediate in their characters between *Ananchytes* and the true *Spatangida*. To the account of the species figured I have added notices of all the forms of this curious type which are known to me as British.

EDWARD FORBES.

October, 1852.

---

# BRITISH FOSSILS.

## DECADE IV. PLATE III.

### ACROSALENIA DECORATA.

[Genus ACROSALENIA. AGASSIZ. (Sub-kingdom Radiata. Class Echinodermata. Order Echinoidea. Family Echinidæ.) Body spheroidal, usually depressed; ambulacral and interambulacral segments developed, the former bearing two rows of small secondary tubercles, the latter two rows of unequal large primaries; tubercles perforate and placed on crenulated bosses; anus excentric, included within the apical disk, which is formed of five genital and five ocular plates, with one or more supplementary plates. Ambulacral avenues with the pairs of pores falling into single file above and on the sides, and becoming distinctly three-ranked near the mouth.]

SYNONYMS. *Milnia decorata*, HAIME, Annales des Sciences Naturelles, 3d series, vol. xii., Zoologie, p. 217, plate iii. fig. 1. 2. 3. (1849.) *Acrosalenia decorata*, WRIGHT, Annals and Mag. of Natural History, 2d series, vol. ix. p. 81. (1851.)

DIAGNOSIS. *A. ambulacris tumidis, tuberculis minutis biseriatis dispositis, remotis; interambulacrorum tuberculis antero-lateralibus mediocribus, superioribus minimis, areolis omnium confluentibus.*

In the twelfth volume of the "Annales des Sciences Naturelles," M. Jules Haime has described and figured a remarkable Echinite which he had seen in the collection of the British Museum, on the supposition that the specimen in question exhibited characters not met with in any known genus of Sea-Urchins, and that it combined the anal arrangements of the *Cassidulidæ* with the usual characters of the *Cidaridæ*, an union of structures hitherto unobserved. He constituted for it a new genus, *Milnea*, and as such features prevented its assignment to any family of Sea-Urchins hitherto defined, he made it the type of a new family, which he designated *Pseudocidarides*. Misled by the sound of the name of the place mentioned as its locality, M. Haime considered it as probably a tertiary species, and from Malta.

My prejudices led me, in spite of my esteem for the authority and abilities of M. Haime, to doubt the probability of the existence of a combination of characters such as those described and figured; and upon inquiry at the British Museum, my friend Mr. S. P. Woodward, who had shown the specimen in question to its describer, was so kind as to submit it to me for a minute examination. The result is, that the proposed new genus must be cancelled, and that so far from presenting any extraordinary anomalies, this urchin belongs (as Mr. Woodward, indeed, had been aware of before) to the genus *Acrosalenia*. M. Haime had been misled by the im-



perfection of the specimen and the casual examination which he had been enabled to bestow upon it. Desirous of rectifying the error before it might affect generalizations concerning the classification of *Echinoidea*, I had the original example drawn in all its details and engraved, and on a second visit of M. Haime to London, that gentleman, on sight of more perfect evidence, at once candidly admitted the correction of his original description. Soon afterwards, finding that my friend Dr. Wright having also met with this fossil, was about to publish it as a new *Acrosalenia* under another name, I communicated to him the engraving which illustrates this paper, with the information of the appellation bestowed upon it by M. Haime, and which was at once very properly adopted by Dr. Wright, and appended to a full description of this species published in the Annals of Natural History. Through the last-named able naturalist I have been enabled to complete my analysis of this curious and beautiful Echinite, by adding full particulars and figures respecting the apical disk, and an account of the spines belonging to it.

The body of *Acrosalenia decorata* is remarkable for presenting a pentagonal outline, the five angles being made by the five ambulacral segments, which are tumid and rounded, whereas the interambulacral divisions are depressed and as if flattened. Above, this urchin is depressed; beneath, it is hollowed out. The interambulacral areas are, centro-laterally, two and a half times as broad as the ambulacrals. The latter bear two rows of small secondary tubercles, each row distant from the other, and placed nearly or quite marginally with respect to the segment, and having the tubercles belonging to itself also ranged at regular distances. In an ordinary specimen there are about twenty ambulacral tubercles in a row. They are perforate, and placed on more or less distinctly crenulated bosses. The centre of each ambulacral segment is occupied by a rather broad band of nearly equal granules. The interambulacral segments are each composed of two series of plates, each plate bearing a prominent and perforated primary tubercle placed on the summit of a crenulated boss, surrounded by a smooth depressed areola. The outer and inner margins of each plate are occupied by a raised granulated space of some breadth, and that portion of the outer space immediately bordering the areolæ has two or three minute secondary tubercles at regular distances rising among the granules. The central granulated (sutural) space on each interambulacral segment forms a broad and conspicuous undulated band. Of the ten interambulacral tubercles in each vertical

series, the three centro-lateral ones are very large and conspicuous; those between them and the mouth much smaller but still prominent; those between them and the apical disk very small and inconspicuous. The areolæ of the latter are but slightly depressed and not well defined; but the areolæ of all are often confluent; when not so, it is the uppermost tubercles only that are separated by granules. The avenues of pores are very slightly sinuous. The pairs of pores are set rather obliquely in single file, except near the mouth, where they fall into indistinct ranks of threes. The mouth occupies about half the diameter of the under surface, and is lodged in a concavity with rounded and tumid sides. It is distinctly decagonal and ten-notched; the margins of the notches are strongly reflected.

The apical disk is oblong, with the vent excentric and placed far back, so as to encroach in some specimens on the posterior ambulacrum. It is not prominent but rather plane. It is composed of five genital plates, five oculars, and from three to six supplementary plates, one of which is regular and sub-central. All are ornamented with scattered granules surrounded by well-marked areolæ. The antero-lateral genital plates are large, shield-shaped, and nearly regular. The postero-laterals are similar, but somewhat oblique. Both bear their perforations sub-marginally within their projecting anterior angulated portions. The posterior genital plate, bounding the vent, is very narrow and semi-lunar; it has the perforation distinctly marked. The oculars are well-marked, broad, and rather large; the three anterior ones symmetrical; but the two hinder ones are unsymmetrical, being narrowed and produced posteally. In all, the eye-perforations are lodged in a marginal depression. The supplementary or sur-anal plates are polygonal; the hinder ones smallest.

The primary spines are sub-cylindrical, subulate, and to the eye appear nearly smooth; but under the lens they are seen to be obsoletely striated. They are often slightly curved near their bases, and have their neck-rings set obliquely. The longer ones exceed somewhat in length the diameter of the body. The secondary spines are very small, rather stouter in proportion to their length, and more distinctly striated.

The largest specimen which I have seen measured three-fourths of an inch in diameter, had a disk three-tenths of an inch in length by three-twelfths in breadth, and primary spines one inch long. A smaller and more ordinary example is seven-twelfths of an inch in diameter by four-twelfths in height.

*Locality and Geological Position.* Our specimens in the Museum of Practical Geology were collected during the researches of the Survey at Steeple Ashton and near Abbotsbury Castle, in both instances in the Coral rag. Dr. Wright's examples were collected "from the yellow clays and ragstones of the Coralline Oolite in Wilts." The specimen described by M. Jules Haime came from the Coral rag near Malton.

#### DESCRIPTION OF PLATE III.

- Figs. 1. 2. and 3. Views of the original specimen upon which *Milnea decorata* was founded.  
 Fig. 4. A magnified view of the apical disk of the same specimen, in which, in consequence of the very narrow and abnormally semi-lunar posterior genital plate, and the loss of the anterior sur-anal plates, a large and ovate vent appears to belong to the posterior ambulacral segment. It was this appearance that misled M. Haime.  
 Fig. 5. Portion of the under surface highly magnified, showing the triplication of the pairs of pores near the mouth, and the deep notches with reflected margins.  
 Fig. 6. Ambulacral and interambulacral plates of the surface near the disk.  
 Fig. 7. Similar plates from the centro-lateral region of the segments.  
 Fig. 8. A primary tubercle with its crenulated boss.  
 Fig. 9. Primary spines of the natural size.  
 Fig. 10. The base of a primary spine magnified.  
 Fig. 11. Magnified view of a secondary spine.  
 Fig. 12. A plate from the disk.  
 Fig. 13. Outline of a very complete disk (from a specimen communicated by Dr. Wright).

#### *Note on undescribed species of ACROSALENIA.*

##### 1. *Acrosalenia pustulata*, sp. nov.

A. ambulacris angustis, tuberculis parvis in seriebus duobus approximatis subalternatis dispositis; interambulacrorum tuberculis centro-lateralibus magnis, superioribus minutis; areolis disjunctis; areâ centrali angustissimâ, bigranulatâ, granulis sparsis.

Diam.  $\frac{1}{2}$  unc. Alt.  $\frac{1}{4}$  unc.

It resembles *A. decorata*, and holds a position between that species and *A. Wiltoni*.

The spines are very long, slender, and apparently smooth. (Mus. Pr. Geol.)

*Locality.* The Forest marble of Malmesbury.

##### 2. *Acrosalenia radiata*, sp. nov.

A. ambulacris angustis, tuberculis parvis seriebus duobus approximatis alternatis sub-divergentibus dispositis; interambulacrorum tuberculis numerosis regulariter graduatis, superne decreescentibus centro-lateralibus medioeribus, areolis disjunctis; areâ centrali angustâ paucigranulatâ, granulis sparsis.

Diam.  $\frac{7}{12}$  unc. Alt.  $\frac{3}{10}$  unc.

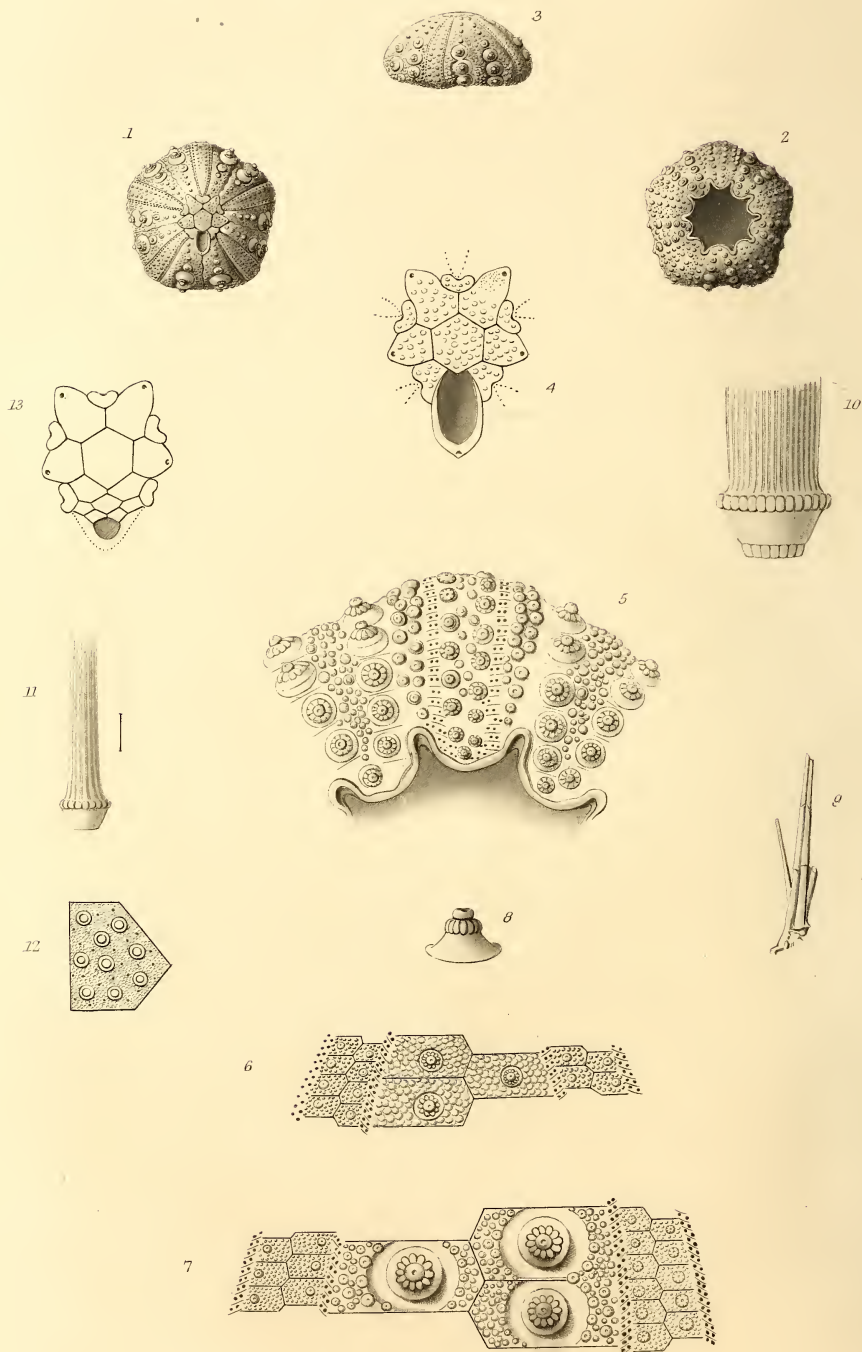
It has affinities with *A. spinosa*, but differs in having the primary tubercles regularly diminishing instead of suddenly decreasing above. (Mus. Pr. Geol.)

*Locality.* Collected by Mr. Lycett in the Great Oolite of Minchinhampton.

EDWARD FORBES.

October, 1852.





ACROSALENIA DECORATA — *Haime*.